

| | | | | |
|---------|------------------------|------|------------|---|
| " | | " | 7 | Donkeyback to hills of Santa Cruz de Vallarta |
| " | Santa Cruz de Vallarta | " | 8-12 | Densely wooded hills |
| " | | " | 13 | Donkey to Puerto Vallarta |
| " | Puerto Vallarta | " | 14-16 | |
| " | " " | " | 17 | Rio de Cuale |
| " | | " | 18-27 | Awaiting transportation |
| " | | " | 29-31 | Mule pack to San Sebastian |
| " | San Sebastian | Jan. | 1-27, 1927 | Surrounding country |
| " | Real Alto | " | 29-Feb. 3 | Surrounding country |
| " | San Sebastian | Feb. | 4-13 | Surrounding country |
| " | Hacienda del Ototal | " | 14-16 | Surrounding country |
| " | Real Alto | " | 18-27 | Surrounding country |
| " | Hacienda del Ototal | Mar. | 2-10 | Surrounding country |
| " | San Sebastian | " | 11-13 | Surrounding country |
| " | Las Mesitas | " | 14-17 | Surrounding country |
| " | San Sebastian | " | 18-27 | Surrounding country |
| " | | " | 26-28 | Pack train through Los Reyes to railroad |
| Nayarit | San Jose del Conde | " | 29 | Arroyo San Jose del Conde |
| | | " | 30-31 | Train to Mazatlan |
| Sinaloa | Mazatlan | Apr. | 1-18 | At Mazatlan |
| | | " | 19 | Left for San Francisco |

Berkeley, Sept. 20, 1928.

THE AVOCADO, A NATIVE AMERICAN TREE FOR HOME PLANTING

W. T. HORNE

Most of us have heard someone say, "I'm crazy about avocados. Do they grow on a tree? Do you think one would grow in my yard?" If it's in California, generally it might. How may we know where it is reasonable to expect or to hope for success with this most unique fruit tree? It would take a long time to give all our opinions and guesses and to tell what we do not know, but where an orange tree will live we might at least try an avocado. This would mean that by far the greater part of the people living in California might try it. In the extreme desert it is said to fail though the orange may succeed.

As to soil requirements we may say it likes good soil—probably somewhat as the sweet cherry. Over large areas of country it grows about as healthily as a cottonwood tree but there are other extensive areas where, if planted, either promptly or finally it dies, without certificate or permit of the pathologist. If we say it is due to deficient drainage we express an opinion which may divert attention from our lack of accurate information. Work under way by Dr. Haas at the Citrus Experiment Station, Riverside, indicates that it is not a plant for alkali or salt, either in the soil or in the irrigation water. It is my belief that the avocado will usually succeed better than an orange in a lawn, a dooryard or an ordinary home garden.

Before we go farther we might stop to ask about the particular qualities of this tree and what its service might be in one's home yard; or estate, if one should be more fortunate. In other words,

what particular forms of pleasure might it contribute to a garden enthusiast?

In general the avocado is a heavy foliaged, evergreen tree with rather large ovate or elliptical to lanceolate leaves. Blossoming is often extremely copious, the flowers being small and on close inspection bearing much resemblance to those of the California Umbellularia (a botanical ally), but instead of yellow and green they show white and green. The fruit also tends to conceal itself among the leaves so that neither flowers nor fruit claim especial decorative merit. A number of varieties have been named and part of these are available from nurserymen. Among them there is considerable variety in figure of tree, color, and behavior. Seedlings are easily grown but they are uncertain as to character of tree and fruit and as to fruitfulness. It would seem that all avocado fruits are good, but the rest of the Scotch saying holds.

In a home yard usually a certain space is available. If there is ample room a "Fuerte" tree may be planted. This is the only fully approved variety for commercial planting, as judged by the qualities of the fruit. It is the medium sized, pear-shaped, green fruit seen during winter and spring on our markets. It is generally conceded that no variety excells it for merchandising or eating purposes. The original tree was discovered at Atlexco, State of Pueblo, Mexico, in 1911. The tree is broad with twigs and leaves drooping but it also grows up well. Leaves are large, long, lanceolate, flat, slightly bronzy at first, becoming a good full green. A leaf before me has petiole $2\frac{1}{2}$ inches long, blade pointed at each end and 8 by 3 inches. While the tree is hardy, another variety may be better in some places.

If one should desire a tree which would come more quickly to a size suitable for the children to build a play house in its branches, then one might choose a "Dorothea", a tree and fruit in many ways like the "Fuerte" but with stronger more sturdy limbs. Or one might choose a "Queen", if cold conditions are very favorable, a large, broad, handsome tree with very large summer fruits esteemed of the finest quality. Or, again, one might have a "Ganter", one of the hardiest and most vigorous of all and with many small light green autumn fruits. If the space suggests a broad low tree the "Knight" would be a worthy candidate. Its aspect is dense, dark green, with the new growth bright yellow washed with brilliant red giving a handsome contrast. It has large oval summer fruit. A beautiful dome shaped tree when young, with large, crowded characteristically curving leaves is the "Nabal". This is one of the later Popenoe introductions with summer fruit of medium size which promises well commercially. The variety which is perhaps second to the "Fuerte" in esteem of the merchant is the "Puebla". It will be seen about Thanksgiving time, a little smaller than "Fuerte", pear-shaped, smooth and glossy purple. The tree is a good one, medium in size, compact, when young broadly conical, deep green with the new growth clear light yellow. While it is hardy and pro-

ductive it has not in all places grown and produced as well as some of the other Mexican varieties.

The type of tree which will be desired perhaps most of all is the tall narrow one needing little space. The ideal variety for this purpose is the "Lyon". Beautiful specimens may be seen in the town of Whittier and in other favored spots. Narrow almost as an Italian cypress, dense, deep green, it is a striking object. It is also precocious and productive with large excellent summer fruits. Seeing some particularly handsome trees of this in a yard in Whittier I called on the owner and he told me that at six years from the bud he had picked from one tree 100 fruits which weighed just about 100 pounds. I was so occupied with the beauty of the specimens that I forgot to ask if they also brought him one hundred dollars—perhaps they did. The "Lyon", however, has not prospered in all places, many have overborne and died, others have failed without evident reason. The "Anaheim" has a growth habit similar to the "Lyon", also producing large summer fruits, and is believed to be more reliable. These tall slender forms should be supported by a strong stake since with their heavy foliage and fruit and brittle wood one is occasionally broken.

The suggestions as to varieties are made with much hesitation. Probably no experienced avocado enthusiast would entirely agree with me. There are many other varieties and I have perhaps missed the best for home planting. The avocado growers association is giving much attention to this matter. Only recently Dr. J. Eliot Coit has discovered a tree near Oroville which promises particularly well in cold situations and introduced it under the name "Duke".

The modern nurseries send out their avocado trees with a ball of earth attached. When one has paid perhaps \$5.00 for a good tree and a similar amount for transportation it is of interest not to lose it. Instructions should be carefully followed. As with a child the tree should not be lifted by the neck, but both hands should be used and the ball should be lifted carefully. The wrapping should not be removed. When the tree is set and most of the earth filled and settled the wrapping may be loosened about the stem, turned back and covered with soil.

For those who do not wish to pay for a nursery tree, seedlings may be grown. A "Fuerte" or some of the small fruits should be chosen. Seeds from southern Florida or the lowlands of tropical countries will usually be of the West Indian type which is tender to frost and has not grown well in California. Hold the seed with the broad end down at the top of a glass or bottle and insert several tooth picks to support it in place. Then add water until the base of the seed is wet and keep in a warm room until the little plant begins to grow. When frost danger is past plant it where you wish it to grow and treat it as you would a hill of corn. Shelter should be given from frost for the first two winters. Both the habit and fruit character will be unknown but if the tree shows no sign of blossoming after several years select a sturdy limb and girdle it

near the base by removing a strip of bark one-eighth inch broad and to the wood. If girdled in early summer blossom buds may appear the next spring on the treated limb. If the tree fails to respond it may be grafted over to a fruitful variety. This operation is not as easy as with a deciduous tree but with care should succeed.

Seedlings are particularly adapted to the amateur and to home planting. All are interesting and there is always the chance to get a better variety than any yet known. If, for instance, a seedling of "Fuerte" should be secured with fruit like its parent and maturing at a different season, or more precocious and reliable in bearing, it would be of immense value to the industry.

The avocado fans (if I may use the term) expatiate upon the high food value of the fruit because of its oil content, yet it is probably true that in nearly every home considerable quantities of wholesome fat are thrown away regularly. I believe that it is also true that in every country where the avocado is known it is as highly and universally prized as the sweet orange. There will be little objection if we say the orange is the best refreshing fruit. Then let us leave the explanation for the charm of this peculiar fruit to those deep students of human nature, the psychologists, or to the nutritionists, or to anybody else who may assail the problem; and, if we want to, let us plant an avocado in the front yard—or two of them—or in the back yard or both. Like all human undertakings our project will not want for troubles, but so far as I know, the avocado has not yet suffered seriously from powdery mildew or aphids (thought occasionally there is some spotting by thrips), it has been free from brown rot, codling worms and pear blight, and it has not been a tempter to the robin nor to the small boy.

Citrus Experiment Station, Riverside.

A NEW CASTILLEJA FROM COLORADO.

LEON KELSO

Castilleja flavoviridis sp. nov. Stems one to several, 7-12 cm. high, purplish, glabrate below to tomentose in the inflorescence: leaves narrowly lanceolate, entire or the uppermost sometimes with one or two teeth, 1-3 cm. long, 2-4 mm. wide, the lower glabrate, the upper puberulent: bracts green, 3-parted to the middle or lower; the lateral lobes narrowly lanceolate to setaceous, divaricate, curved, the middle longer and broader, long-acuminate, with a few teeth in the uppermost bracts; as long as or shorter than the calyx, not concealing the flowers, finely villous to floccose: calyx green or somewhat yellowish, short-villous to tomentose, cleft nearly to the middle or less, about 2 mm. lower on the lower side, the lobes cleft 1-3 mm. into acute teeth; corolla 18-25 mm. long; tube yellowish, equaling or much surpassing the calyx; galea yellowish, 4-6 mm. long, pubescent on the back; lip dark green, 3-4 mm. long, its 3 ovate and acute lobes distinctly yellow, 1 mm. long; anthers 2 mm. long.

This plant is nearest related to *C. puberula* Rydberg, from which it differs chiefly in its entire leaves, 3-parted bracts and tomentum in